Method and Apparatus for Evaluating Polynomials and Rational Functions

Abstract

Disclosed herein are a computer-processing method and apparatus for computing values

5   of polynomials or rational functions. A mathematical software library can advantageously

embody the concepts of this invention. The method can be adapted to compute values for

non-elementary,special functions, for example ERF, ERFC, LGAMMA, and Bessel functions.

The steps for polynomial evaluation include presenting input data that includes coefficients of

polynomial $p(x)$, x, a predetermined x_i, and $p(x_i)$, building polynomial $c(x)$ having coefficients so

10   that polynomial $p(x)$ is expressible as: $p(x) = p(x_i) + \{x - x_i\} \cdot c(x)$, determining each coefficient

of polynomial $c(x)$, determining a value of polynomial $c(x)$, and constructing a value of

polynomial $p(x)$ by determining: $p(x) = p(x_i) + \{x - x_i\} \cdot c(x)$. The method can be adapted for

providing a value for a rational function $r(x) = p(x)/q(x)$, which is a ratio of a numerator

polynomial $p(x)$ and a denominator polynomial $q(x)$.